



SDI Review Form 1.6

PART 1:

Journal Name:	American Journal of Experimental Agriculture
Manuscript Number:	2013 AJEA 3297
Title of the Manuscript:	The Efficiency of Nitrogen Fertilization of Spring Wheat Depending on Seasonal Rainfall

General guideline for Peer Review process is available in this link:

(<http://www.sciencedomain.org/page.php?id=sdi-general-editorial-policy#Peer-Review-Guideline>)

- This form has total 9 parts. Kindly note that you should use all the parts of this review form.



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PART 2: Review Comments

	Reviewer's comment	Author's comment <i>(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
<u>Compulsory</u> REVISION comments	1. Lines 21-22: I do not entirely agree with the statement as written (i.e. is "significant increase in yield" meant to portray "statistical significance" or a large increase?). In my experience, significant yield increases (large increases) due to fertilizer applications are often economically justified. Fertilizing beyond the most economic rate to achieve maximum yields is where there may be a statistically significant improvement in yield, but an obvious loss in profitability. 2. Lines 29-32: This sentence is poorly worded and difficult to follow. While I do not dispute the importance of available moisture for the efficient and effective use of fertilizer N, there seems to be a bit of a paradox in the thinking presented here. What is the benefit of accurately predicting the N rate for different moisture scenarios when I cannot predict the seasonal rainfall that I may get? I think it would be beneficial if the author provided his rationale for wanting to better predict N requirements under different moisture regimes. It is partially alluded to in terms of soil texture, but are there additional aspects of climate change, potential for irrigation etc. that would modify what a farmer would choose as a suitable rate given the uncertainty of "seasonal precipitation"? 3. Line 42: I am assuming by "stocking rate" the author is referring to numbers of livestock animals per farm. Low stocking rates is not a problem in several regions of the world with intensive agricultural production and given the scope of the paper I don't think this comment or sentence is needed. 4. Line 56: When one says "...plants were well supplied with rain water during emergencies..." it almost sounds as if plants were irrigated with	



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	rain water when needed. A wording change is required. Perhaps something like “In 2006, timely precipitation occurred during the critical plant growth stages of tillering and shooting (table 1) although the remainder of the growing season had significant moisture deficits.” 5. Lines 108 – 126: I am not familiar with some of the terminology the author has used here. This section is a little more confusing and verbose than it needs to be. I would suggest re-writing it in the following sequence: i) start off with yields were fitted to a quadratic model: $Y = aN^2 + bN + c$, where Y is the yield is wheat grain yield (kg/ha), N is the fertilizer N application rate (kg/ha), a is the intercept and b and c are regression coefficients. ii) taking the first derivative of the quadratic model allows for the calculation of the slope (i.e dY/dN) at any selected value of N. iii) setting the slope to zero allows the calculation of the agronomic optimal rate of N (AORN) that corresponds to the maximum yield (i.e. $0 = 2a(AORN) + b$, solving for AORN gives $AORN = -b/2a$). iv) setting the slope to equal the price ratio (PR) allows for the calculation of most economic rate of nitrogen (MERN) (i.e. $PR = 2a(MERN) + b$, solving for MERN gives $MERN = (PR-b)/2a$). v) one can then discuss the values used to calculate the price ratio and thus the MERN. 6. The author should acknowledge the fact that the N fertilization treatment used in this study is potentially a function of both rate of N applied and timing of that application (i.e. for higher N rates, a different amount of N was applied bot preplant and during the growing season). A comment as to whether or not this would have possibly impacted either the AORN or MERN should also be considered. 7. I am a little confused as to what exactly was returned back to the soil following the catch crops. Is it just the postharvest residue or is it the	
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	entire biomass? In table 3, what residue is left after postharvest that is not part of the aboveground plant parts? I would have thought total above ground biomass would have included all the plant material above ground, the postharvest biomass, would have been what was left in the field after harvest, and the difference between these two numbers would be what was removed as yield. I don't understand why the author has added above ground plant parts and crop residue together. Perhaps it is just a poor choice of words. 8. Lines 200-202: How was the comparison between 40 kg N with catch crop vs 80 kg N in the control carried out? I do not see the statistical results for this comparison made anywhere. 9. In discussion about the different catch crops, it might be useful if the author considered the potential differences in root:shoot ratios of the crop species used. He only measured above ground biomass which is not necessarily the best indicator of N immobilization or uptake by the crop. 10. In several places the authors indicates that a given N rate is not profitable. The only time the application of N is unprofitable is when the increased value of the crop is less than the cost of fertilizer applied. So applying N to get maximum yield is usually profitable, but not as profitable as applying at the MERN.	
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Minor REVISION comments	1. Line 52: Wording change “...on the basis of two factors by a field...” 2. Line 76: It would be far more informative to the reader to give the actual soil test values and the soil test method, than to just say the soils were rich in P and K with average Mg. 3. Lines 80-82: If catch crops were harvested and yield determined, what was returned back to the soil? Again I think the author needs to give a bit more detail as to what was done. I assume a small area of the plot was harvested for biomass production and the biomass on the rest of the plot returned to the soil through cultivation. 4. I am not familiar with the term “roller aggregate”. Does the author mean “roller packer”? 5. Lines 94-95: Does “observations and measurement unit” simply mean “weather station”?	
Optional/General comments	Throughout the entire paper I was questioning the usefulness of determining the impact of water on crop response to N when one could not predict the rainfall a given season would provide. It was not until	

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